

**ABSTRACT**

The present invention includes a Command Queuing Engine (CQE) that is a firmware-assist block which processes some of the firmware tasks related to command and context management preferably for SCSI. When enabled, CQE will decode SCSI commands as they arrive, and determine if DMA contexts can be automatically configured and started to transfer the data for those commands. CQE can also program DMA contexts to automatically return status information either after the disk has completed a transfer (as in non-cached writes) or after the DMA transfer is completed (as in reads or cached writes). CQE also utilizes a buffer-based linked-list to queue the SCSI commands as they arrive for future DMA context configuration.

The present invention provides automated recognition and linking of commands belonging to a common thread, i.e., are sequential. The present invention also provides extensive thread boundary information and flexible firmware control for reordering commands. Automatic TE entry generation and storage to buffer memory, and automatic TE retrieval from the buffer memory and execution of entire command threads are further features provided by the present invention. As a result, bus command response latency is decreased by reducing the delay for the command to be started and at the end of the data transfer for status to be send. Disk efficiency is increased by reducing the latency to back-fill or empty a buffer memory segment of data that will be transferred. Furthermore, the present invention is a low-cost trade-off between hardware and firmware functionality.